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he shot several spike horns, and one at least was a large buck of *four years* if not of five, and was so considered by several old hunters. In this specimen one of the horns was slightly forked at the end, but the other was a simple slightly curved spike. Mr. Bromley says that any old hunter of the Saranac region would laugh at the idea of all the spike horns being young bucks of two or three years, and he states that they can be recognized by their *shorter legs*, as well as by their spike horns.

Mr. Bromley thinks that the spike horns have increased in numbers over the branched horns, and that in spite of the extensive hunting are about as abundant as when he first went into the woods. — F. W. P.

DEER'S HORNS. — It is a well known fact that the horns of deer are but very seldom found in the woods, even in districts where the deer are very plenty. Several ways of accounting for their disappearance have been suggested, but the cause that seems to be the best substantiated is that of their being eaten by the various species of rodents seeking their food under the snow in early spring. In confirmation of this theory Mr. H. H. Bromley of Keeseville, N. Y., has informed me that he once found a deer's horn in the woods that had been partly gnawed, and had been nearly eaten through in two places by mice. — F. W. P.

SINGULAR MANNERS AND CUSTOMS OF THE HORNBILLS DURING THE BREEDING SEASON. — No sooner has the hen commenced the labor of incubation, say several trustworthy observers on this subject, than the male walls up the hole in the hollow tree in which the hen is sitting on her eggs, until there is only room for the point of her bill to protrude, so that until her young birds are hatched she remains confined to her nest, and is in the meantime assiduously fed by her mate, who devotes himself entirely to this object. This habit has been testified to not only by Tickell, Layard, and other Indian naturalists concerning some of the Asiatic species, but is also spoken of by Dr. Livingstone in the case of hornbills met with during his African explorations, and there appears to be no doubt of its authenticity. In Sumatra, in 1862, Mr. Wallace heard the same story from his hunters, and was taken to see a nest of the concave-casqued hornbill, in which, after the male bird had been shot while in the act of feeding its mate, the female was discovered walled up. "With great difficulty," Mr. Wallace tells us, "I persuaded some natives to climb up the tree, and bring me the bird. This they did, alive, and along with it a young one, apparently not many days old, and a most remarkable object. It was about the size of a half-grown duckling, but so flabby and semi-transparent as to resemble a bladder of jelly, furnished with head, legs, and rudimentary wings, but with not a sign of a feather, except a few lines of points indicating where they would come." — *Nature*.

GEOLOGY.

THE MEGATHERIUM AND ITS ALLIES. — The law of adherence to type, or pattern, in the skeletons of the Megatherium, Megalonyx and Mylodon, extinct animals of the sloth tribe, appears to be illustrated in a remarkable manner in the following particulars: —

First. — In the great size, weight and solid condition of the bones of the extremities and in their want of medullary cavities.

Second. — In the number, arrangement, $\frac{5}{4}$ - $\frac{5}{4}$, mode and unlimited growth of their teeth; in their deep insertion into the jaws; their deeply excavated base; in the structure of their teeth, when viewed as organs, — made up of a cylinder of vascular dentine, dentine and cementum, and more particularly in the striking resemblance of their organization when examined under the microscope; that of the *Megatherium* and *Myodon* being precisely the same, with the exception of the looped canals or tubules in the cementum, as figured by Prof. Owen in the article *Odontography*, in the “*Encyclopædia Britannica*.”

Third. — The bones of the skull resemble each other strongly in the great development of the cells of the diploë, which in their general appearance resemble wood eaten through and through by the largest sized worms; and in the shortness of the face. The alveoli of the two jaws correspond in number, position and relative depth, with the exception of *Megalonyx*, which has its first molar in the upper and lower jaw separated from the other teeth and taking the usual place of the canine or cuspidate teeth.

Fourth. — The bones of the chest and trunk have, in general, a strong resemblance in size and form, especially the ribs in size, the scapula in form, the expanded ilia, and the clavicles. The bones of the hand and arm have a marked family likeness — the radius and ulna of *Megatherium* and *Megalonyx*, the humerus of *Megalonyx* and *Myodon* in particular, and in all the genera in the broad expansion of the external and internal condyles of the humerus for the origin of the supinator and pronator muscles. The differences between these in outline and form from that of *Megatherium* will be hereafter alluded to.

Fifth. — The number and size of the bones in the tail of *Megatherium* and *Myodon*, and the use to which this appendage is put, appear to be precisely the same, making with the posterior extremities a most stable tripod for the support of these animals while reaching for their food.

Sixth. — In the broad and massive femur of the *Megatherium* and *Megalonyx* there is a marked resemblance: as figured in Ledy's “*Memoir*” and in the “*Penny Cyclopædia*” and “*Encyclopædia Britannica*,” this bone in the *Myodon* appears not to be so flattened in front, but this appearance may be only the result of foreshortening in the drawing; judging from a fragment in my possession it does not differ much from the femur in *Megatherium* or *Megalonyx*. The tibia of *Megalonyx* bears considerable resemblance in form to that of *Myodon*, but it is not united in either of these animals (making as it were one bone) as in *Megatherium*.

The bones of these extinct animals differ somewhat: —

First. — In the general outline of the lower jaw of *Megatherium*, especially that of *Meg. Cuvieri* from South America; less so, however, in that part where the teeth are implanted in the N. American *Megatherium*, and in its anterior prolongation.

Second. — The skulls of *Megalonyx* and *Myodon*, looking at them either from above or below, differ somewhat, especially in their width;

this difference, however, may be the result simply of the displacement forwards of the first molar, as appears to be the case with some varieties of dogs.

Third. — The humerus of the *Megatherium* differs from that of *Megalonyx* and *Myodon* chiefly in that part from which the *brachialis anticus* muscle arises. The bone in *Megatherium* at this point, viz., on either side of the insertion of the deltoid, being broad and flat, while, in *Megalonyx* and *Myodon* especially it forms, with a marked prominence on the outside of the bone, a large hollow surface looking outward and backward, for the origin of the external part of the muscle, and which large and deep groove seems to have been filled up by it. The distal extremity of the humerus of *Megalonyx* is pierced by a large but short oval canal for the passage of the median nerve and brachial artery, which canal is not to be seen in the humerus of the *Megatherium* or *Myodon*, although there is in the humerus of the latter a groove near this spot along which, in all probability the nerve and artery passed in their course to the forearm.

Fourth. — The astragalus of the *Megalonyx*, Dr. Leidy says "bears much more resemblance to that of the recent, than to any of the extinct sloths. That of the *Megatherium* is the most characteristic bone in the skeleton: the upper surface being so hollowed on one side, as to throw the whole weight of the leg upon the inner side of the foot."

Fifth. — The cubitus of *Myodon*, as figured by Dr. Harlan, very slightly resembles either that of *Megatherium* or *Megalonyx*.

From the few facts above stated, it would be unwise to draw hasty conclusions, and if the three genera have a common parentage it would be difficult to say to which genus the first pair belonged. Are there not, however, as strongly marked resemblances between the skeletons of the different members of this extinct tribe of animals as are to be found in *Hipparion*, *Anchitherium* and *Equus*, which have been brought forward by Professor Huxley in confirmation of Mr. Darwin's hypothesis?

The marked resemblance between the skeletons of the *Megatherium* and *Myodon* as set up in the Museum of the Royal College of Surgeons, London, and in the Museum of the Boston Society of Natural History, must be acknowledged by all who have seen the skeletons, or the figures of them under the articles *Unanu*, "Penny Cyclopædia," *Palæontology*, "Encyclopædia Britannica," and the beautiful photograph by Mr. Allen of Boston.

No less marked will appear the mechanism of the elbow joint in all the genera of these digging animals, and the upper or mashing surface of their teeth, so characteristic of all the *Megatheroid* tribe — the surface presenting at one time "a transverse sulcate plane, at another, excavated in the midst, with prominent margins." — H. C. PERKINS, M.D.

THE TERTIARY BEDS OF THE AMAZON. — Up to December, 1867, no fossils had been observed in the peculiar variegated clay formation which overspreads the great valley of the Amazon. At that time I was sojourning with my friend Hauxwell at Pebas, where I discovered a multitude of

fossil shells exposed in the fine section made by the Ambiyacu just before it reaches the Marañon. These shells were examined by Gabb, who showed that they existed in brackish water of Tertiary date; but he made the mistake of identifying the Neritina as *N. pupa*, which is now living. Conrad shows it is an extinct species. I then engaged Mr. Hauxwell to explore for other localities, being sure they would be found. He soon reported a similar deposit thirty miles below Pebas on the south side of the Marañon, about one hundred and twenty miles west of Tabatinga, where he found the very same species occurring at Pebas, and many more, and larger kinds. Out of half a bushel of specimens which he sent me, this is the result arrived at by our eminent palæontologist, Mr. Conrad. Not one species was found in the whole collection which is now living; indicating an early tertiary date. There were seventeen distinct species, *all extinct*, belonging to genera only three of which are now represented. The most numerous species seems to be the *Anisothyris* (*Pachydon*) *obliquus*. In the whole collection there is but one land shell (*Bulimus*), and but one decidedly fresh-water species (*Hemisinus*). The great majority belong to a genus which was especially abundant in the early Tertiary, and lived in brackish water. This agrees perfectly with my theory of the origin of the Amazon Valley; at first a Mediterranean sea separated from the Caribbean and South Atlantic by the rise of the water-sheds which created the Orinoco and Paraguay, it was gradually freshened by the influx of the fresh-water streams from the surrounding highlands, and gradually emptied into the Atlantic by the continued rise of the Andes. The fossils were found in the heart of the valley interstratified with the colored laminated clays which I had traced from Curary on the Rio Napo down to the Lower Amazon, and which Agassiz affirms is a glacial deposit brought down from the Andes and worked over by a vast glacier moving over the whole plain. This is mere assertion, for he found not one positive evidence. Besides, there are strong biological and physical arguments against the theory of tropical glaciers. My fossils are wonderfully perfect, even the most minute and delicate ones, and none show the least abrasion; a glacier would have ground them to powder. Conrad says they must have lived and died in the vicinity of the spot where they now occur so abundantly.—JAMES ORTON, Nov. 15, 1870.

LEAD MINES OF MISSOURI. — Mr. G. C. Broadhead read a paper before the St. Louis Academy of Science in October, entitled "Notes on the Geology of Cole County, Missouri." He mentions that the Magnesian limestone series, which include the rich mineral deposits of Missouri, occur in Cole County, and that the rich Galena lead mines are in the lower beds of the second Magnesian limestone. At Fowler's mines he noticed lead, zinc, and heavy spar; the latter in very clear amber-colored crystals and in blue lamellar forms.

MARKS OF ANCIENT GLACIERS ON THE PACIFIC COAST. — Dr. Robert Brown dissents from the theory of an entire absence of glacial remains proper on the Pacific slope of the Rocky Mountains, stating that the

northern drift is present in Vancouver Island and British Columbia, "in as marked a manner as ever I saw it in countries celebrated for the presence of such remains."

He finds rounded hills, trap bosses, rounded rocks, and grooves, while the whole country is strewn with erratic boulders. Great masses, sixty to one hundred tons in weight, are found scattered everywhere over the island (Vancouver) from north to south, and through the region lying on the western slope of the Cascade Mountains. "Grooving and other unequivocal marks of *general* ice action are not wanting in Washington Territory either. The drift marks extend northward to the Queen Charlotte Islands, near the boundary line of Alaska. — *American Journal of Science*.

BOULDERS IN ANCIENT TIMES. — In a communication made to the Academy of Sciences of Vienna, M. Boué remarked on the accumulations of boulders in secondary deposits and in the sandstones and conglomerates of the tertiary period. These accumulations have been explained either by the mining force of the currents of water, or by subterranean displacements, or by aqueous eruptions. The most ancient of these blocks are found in the older carboniferous sandstone. They have been traced between Jurassic and Cretaceous beds, and in the latter; but nowhere do they more frequently occur than in the Eocene and Miocene beds of the Alps. These last have been very probably transported by glaciers, though he could not admit, as some geologists have, that the glaciers have hollowed out the basins of the lakes, or had existed in the course of almost all geological periods. — *Cosmos*.

NEW DISCOVERY RESPECTING COCCOLITHS. — Dr. Gümbel, of Munich, has recently, in a letter to *Nature*, No. 26, for April 28th, established the existence of coccoliths and coccospheres, almost identical in structure with those detected by Professor Huxley, in recent deep-sea dredgings from the bed of the Atlantic, in the Trenton limestone and in a yellow limestone of the Potsdam series, much lower down than they have hitherto been discovered. He finds that the organic remains of these minute animals are left as a residuum after the matrix in which they occur has been heated with highly-diluted acetic or hydrochloric acid.

NOTES.

The Yale College scientific party, in charge of Professor O. C. Marsh, which left New Haven in June last for the Rocky Mountains, returned to this city on the 18th of December. The party, which was essentially a private one, consisted of Professor Marsh and twelve companions, all students or recent-graduates of the College. The main object of the ex-